Accelerator Exp. - Revisit of Local Aperture Scans in the Booster

Date: August 12, 1974

In conjunction with magnet realignments in the booster, a sampling has been made of the local bump aperture scans that were taken in May 1973.

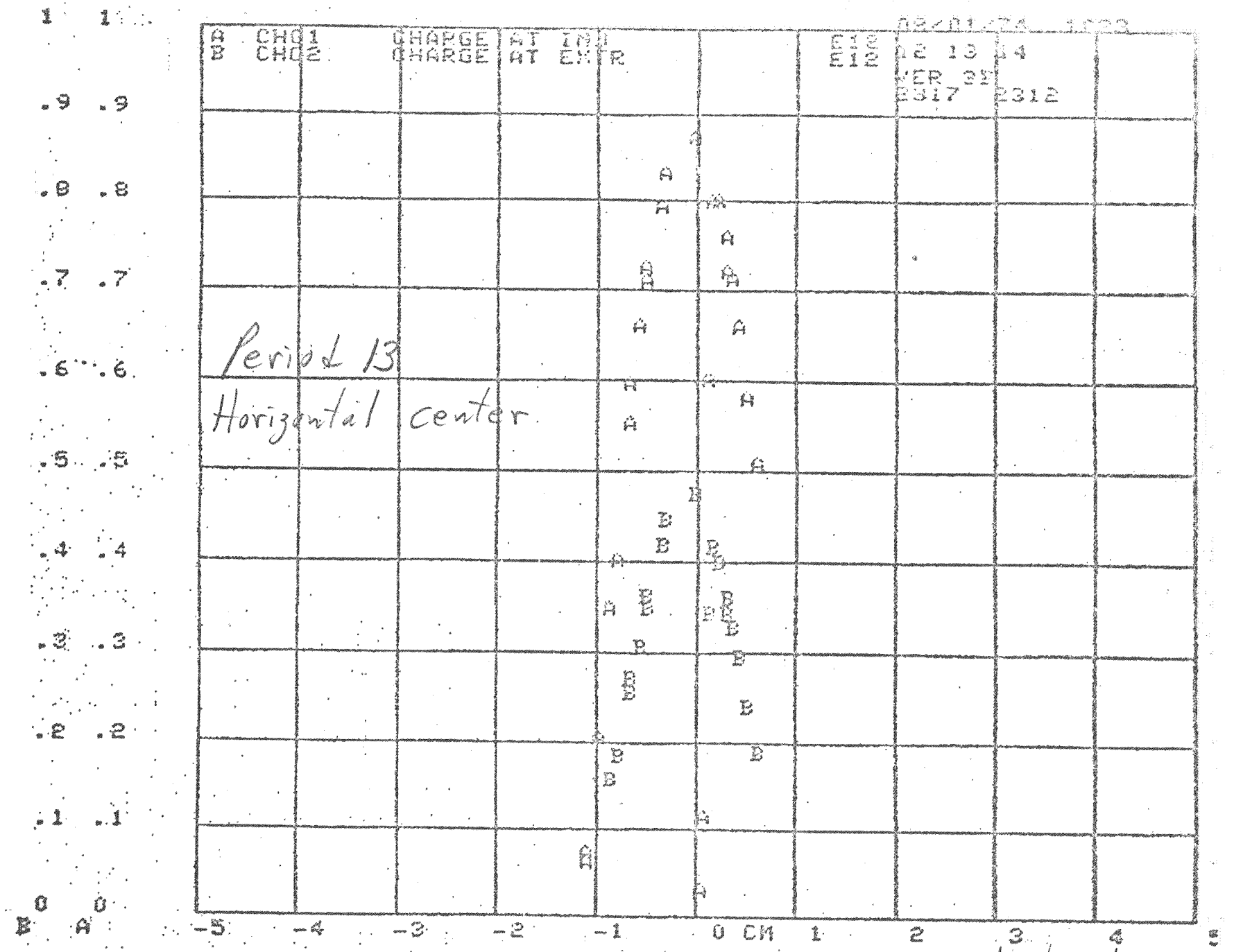
Using the standard corrections dipoles (Horizontal Short and Vertical Longs) local three bumps are used to scan vertically at several horizontal positions. Bump dipole ratios are not corrected for lumped correction elements. Scans were made with bump centers in Periods 4, 7, 10, 11, 12, 13, 15, and 17. The sign of the vertical displacement on the scan plots is backwards such that plus is down not up. The actual vertical motion is 50% larger than that indicated by the scale, because of an incorrect calibration of vertical dipole strength used in the program.

Qualitatively the new data looks very similar to the old. As an example, period 13 at the center horizontal position is shown in Figure 1. The A's are the charge at 200 microseconds after injection and the B's are at 32 milliseconds (extraction). The very narrow restriction here is due to the extraction septum which hangs down into the Booster aperture.

A test magnet move was made to correct the measured angle across long straight 7, which has no aperture restrictions. The move was to reduce to zero the 4.65 mm difference in the up and downstream detectors. The actual move overcorrected about 50 percent, as measured by the position detectors. Figure 2 shows the 1973 vertical scan in period 7 at zero horizontal off-set. Figure 3 and 4 show the same scan made just before and after the magnet move. The scan width appears similar in all three.

The base width of the 1973 scan appears smaller than the "before" scan but not as small as the "after" scan. The 1973 scan used a toroid signal sampled at 200 microsec after injection, not the charge detector. The "before" and "after" scans were done using the same detectors. By viewing an overlay of the two, it is clear that the "after" scan aperture is narrower by 1-2 mm. This is suspected to be due to non-exact replication of injection conditions, particularly the vertical coherent oscillation.

E. Gray



H=0

Figure 1

Vertical

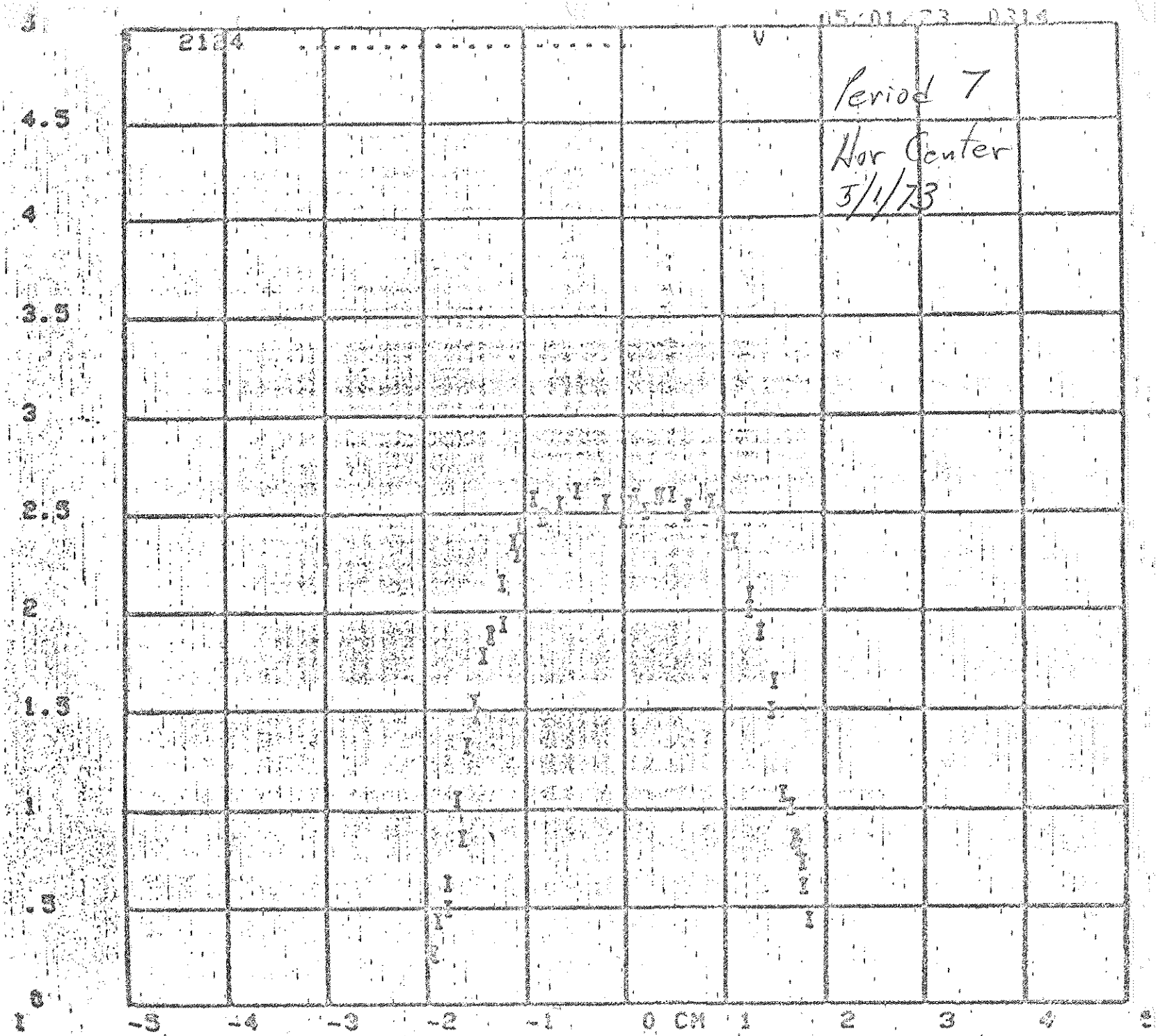

Period 7
Hor Center
3/1/73
4.5
4
3.5
3
2.5
2
1.5
1
.5
0
-5
-4
-3
-2
-1
0 CM
1
2
3
4
5
Vertical

Figure 2

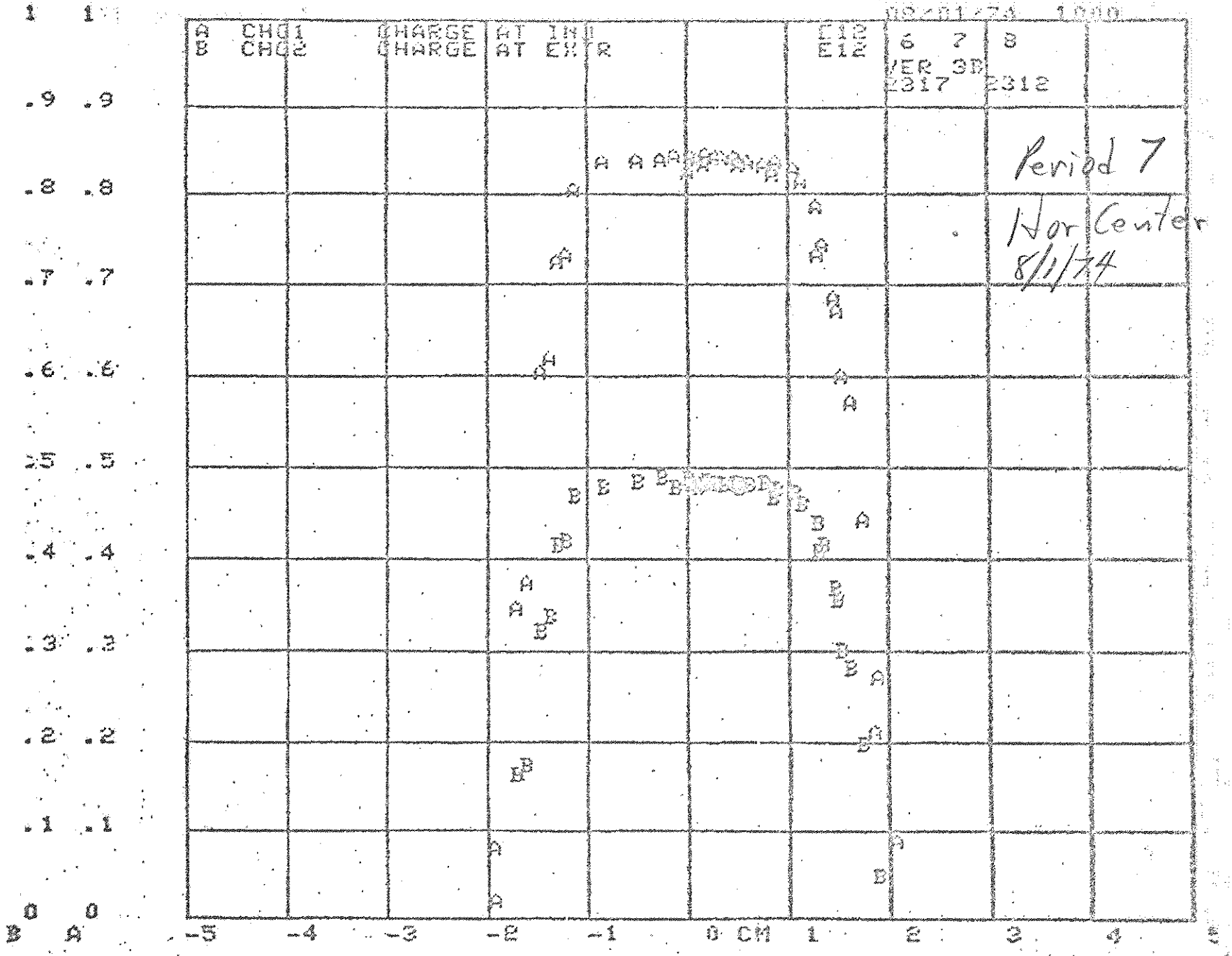


Figure 3

Vertical

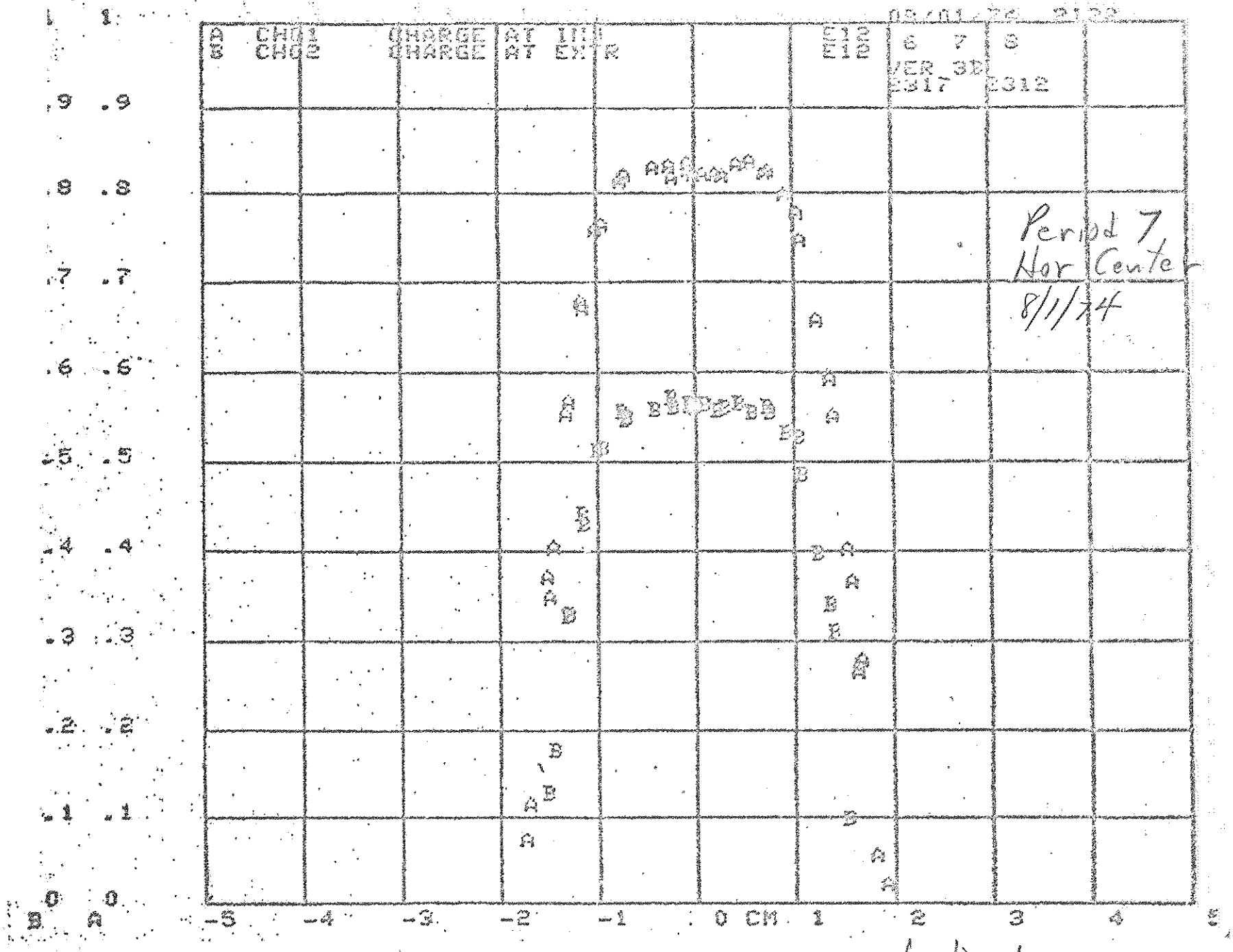

A CH01 CHARGE AT INJ
B CH02 CHARGE AT EXTR
E13
E12
6 7 8
VER 3D
E317 E312
Period 7,
Hor Center
8/1/74
-5 -4 -3 -2 -1 0 CM 1 2 3 4 5
Vertical

Figure 4